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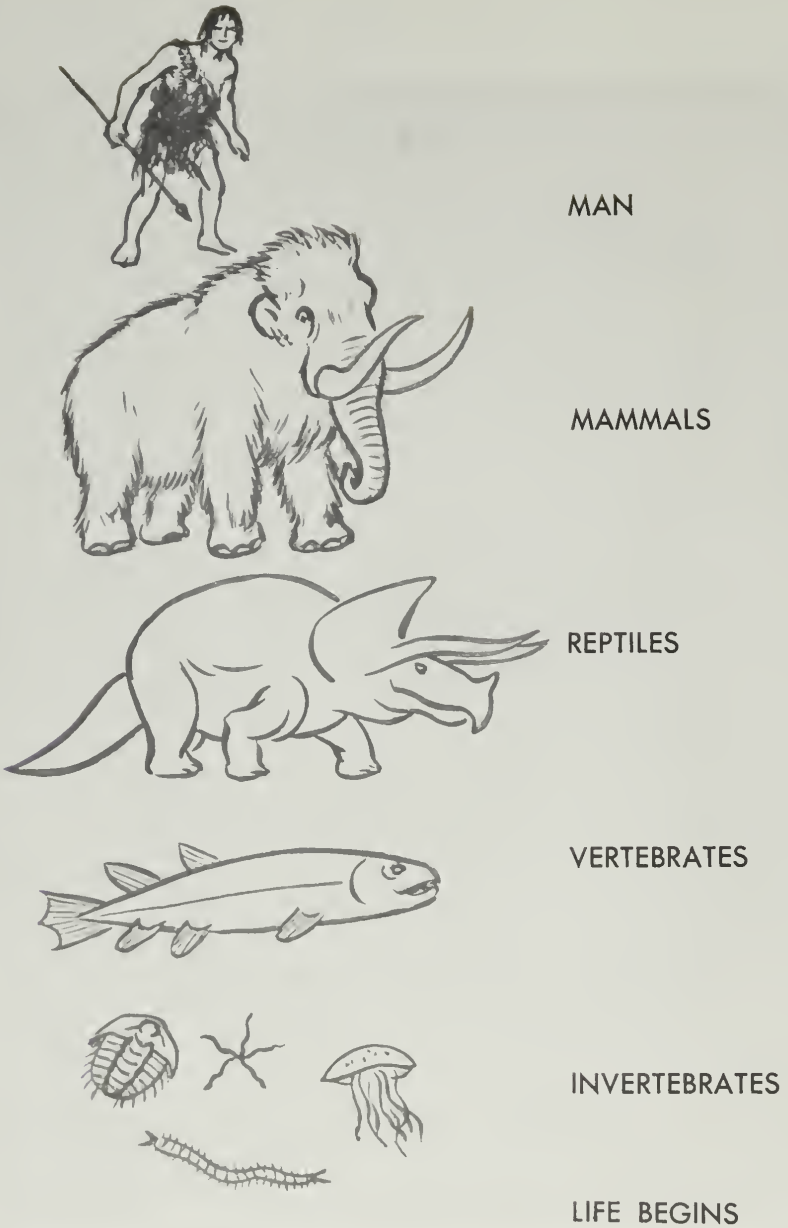
THE WONDERLAND OF PLANTS
WHERE ANIMALS LIVE
DESERT DWELLERS
COME SUMMER, COME WINTER

". . . AND JUAN"
KIDLIK'S KAYAK
RUNNING FOX
TYEE'S TOTEM POLE
LITTLE WOLF

STONES, BONES and ARROWHEADS

by Terry Shannon
illustrated by Charles Payzant

ALBERT WHITMAN & COMPANY · Chicago



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TERRY SHANNON and CHARLES PAYZANT

Hollywood, California
December 1961

SOMEWHERE there's an arrowhead waiting to be picked up. There's a little fossil fish to be found, the bone of a dinosaur or an ancient mammal to be uncovered.

Somewhere there's a mysterious cave to be discovered. In it may be ashes of a cooking fire that glowed thousands of years ago. In that cave, too, may be the bones of the early man who made the fire and cooked his dinner over it.

Some day, perhaps, someone will pick up that arrowhead, find the fossil fish, dig up the ancient animal bone. Some day, perhaps, someone will find the cave in which lie hidden the bones of that man who lived so long ago.

Wouldn't it be exciting if *you* were that someone?

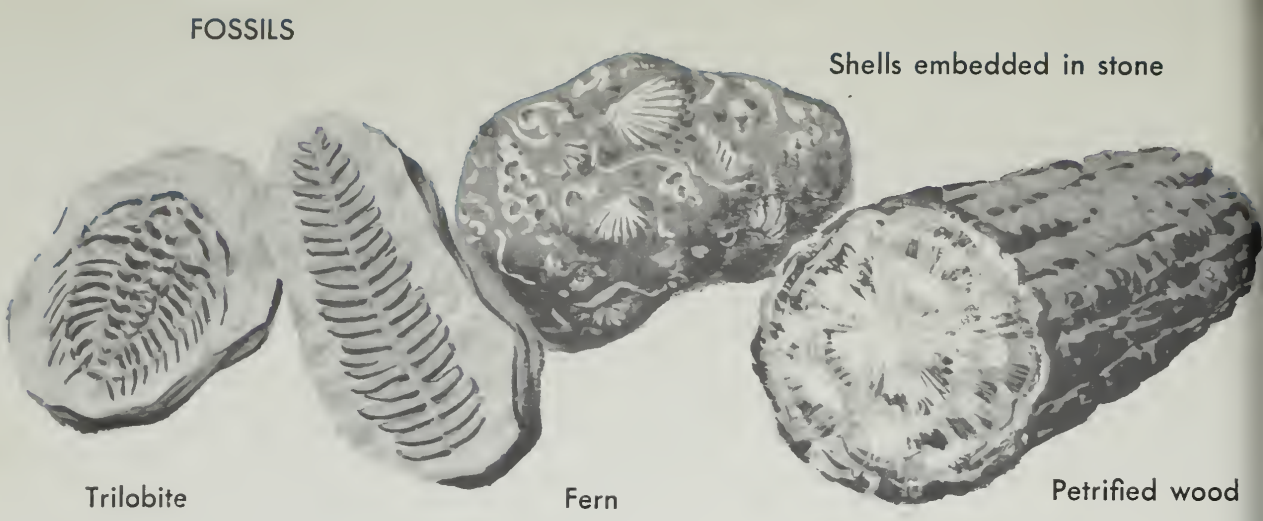
Many arrowheads have already been found, fossils dug up, and caves discovered, some of them by girls and boys. Some have been found accidentally, others only after careful searching and digging.

Boy Scouts some years ago in New Mexico found a cave while they were on a hiking trip in the Sandia Mountains. In the cave lay hidden the bones of ancient mammals, spearpoints, stone knives and scrapers, baskets, and cooking pots.

A ten-year-old boy in the state of Washington spotted a fossil tooth sticking out of a rocky bank. It proved to be the first fossil of its kind found in that area. Scientists say that the tooth belonged to a large mammal that lived millions of years ago.

Hunting fossils in an old rock quarry, a New Jersey boy split a slab of shale and found the skeleton of a small gliding-type reptile. It lived, scientists believe, ten million years earlier than any found up to that date—a most important find.

Several years ago a boy in California found the skull of a great bison that lived many thousands of years ago. He found it while driving his father's sheep home from grazing. That skull is the best example of the species yet found.



Scientists patiently and hopefully hunt for just such finds. They have uncovered bones by the ton of dinosaurs and other creatures that lived and died out before man. They have dug up mountains of earth looking for traces left by people of the past.

From caves, mounds, badlands, fields, even from excavations in the midst of cities, such things have been recovered. From riverbanks and stream beds they've come. From beneath the water skin divers have brought up objects from the past.

Why? Why all this digging? Why do scientists hunt for stones, old bones, and things made by people of long ago?

Just for souvenirs? No, indeed!

Men dig because bones and teeth, leaves and insects, stone tools and weapons, baskets and beads and pots all have tales to tell. Such things—called fossils and artifacts—are part of a story that was written without words. It is the story of the prehistoric past. Scientists examine these finds to add to our knowledge of the story. They hope to fill in missing parts to satisfy our curiosity about life long ago.

Some objects tell about the living things of the earth before as well as after man's appearance. Others tell about man himself and how he lived.

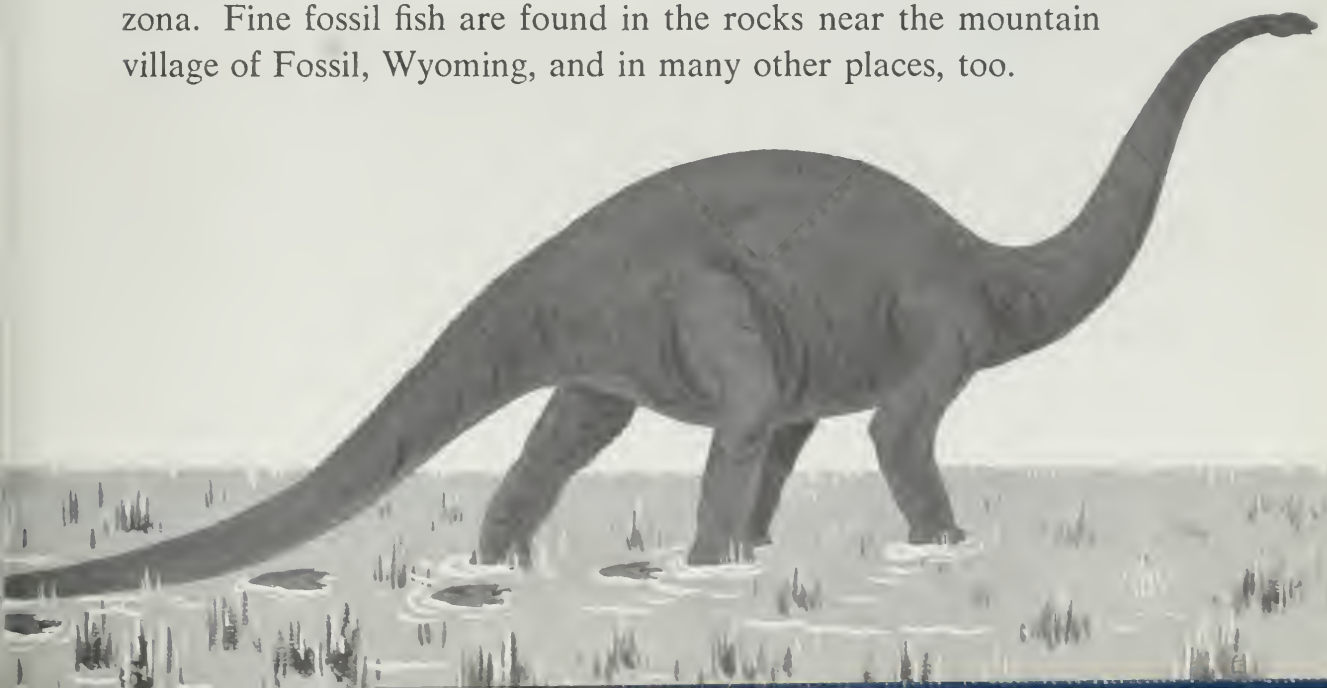
We'll talk about fossils first because they are often clues to plants and animals older than man.

Fossils are the remains or records of once-living plants and animals preserved in the earth's crust in one form or another for thousands or millions of years.

Some fossils appear to be the whole body or skeleton of a creature changed to stone. These fossils came about through a natural process that took many centuries to complete. Once-living plant or animal cells were replaced by minerals from water. In time the minerals hardened to give us an exact copy of the plant or animal in stone.

Nonliving objects, too, have been fossilized—the splash of raindrops, footprints, crawl-marks in mud which turned to stone.

Great logs of petrified wood litter the ground in parts of Arizona. Fine fossil fish are found in the rocks near the mountain village of Fossil, Wyoming, and in many other places, too.



You may wonder how fossil fish and other sea creatures happen to be found in mountain areas, far from water. And you may wonder how it is there are great stone forests in deserts where no trees now grow.

In ages past there were great changes in the earth's climate and in its crust. Layers of new rock were made from worn-down old rock, sand, and mud into which plants and animals had sunk. The earth heaved and settled, mountains of ancient rock and layers of new rock were thrust up, buckled, and twisted. There was dry land where water had once been. It was cold where once it had been warm, warm where once it had been cold. Century after century, changes went on.

Because of these great changes we find strange things in strange places. Fossil palm leaves have been found in the mountains of Colorado and ancient snail shells in the deserts of the Southwest.

The remains of dinosaurs and other prehistoric monsters have been dug up from fossil beds in Alberta, Canada, and in Utah and other parts of the United States. Giant crocodile bones have been found in Texas. And the bones of great lizardlike fish that once swam in waters over Kansas have been dug up there.

From such fossils, and millions more, scientists tell us about what they believe to be a great parade of life through the ages. This parade starts with spineless creatures, such as jellyfish, followed by fish with backbones, dinosaurs and other reptiles, prehistoric mammals, man himself, and all the animals of today.

Recording things in stone, however, is not the only way nature has preserved once-living things. Some fossils are the actual remains, the shells, bones, or flesh, of ancient life.

These fossils include the bones of man, preserved in cool, dry air, quite often buried in caves, and mammals frozen deep in thick ice.

Still other fossils have been preserved in tar. Some of these fossils were taken years ago from the oozing, bubbling tar of the La Brea pits in Los Angeles. More kinds of life were found together there than in any other place in the world.

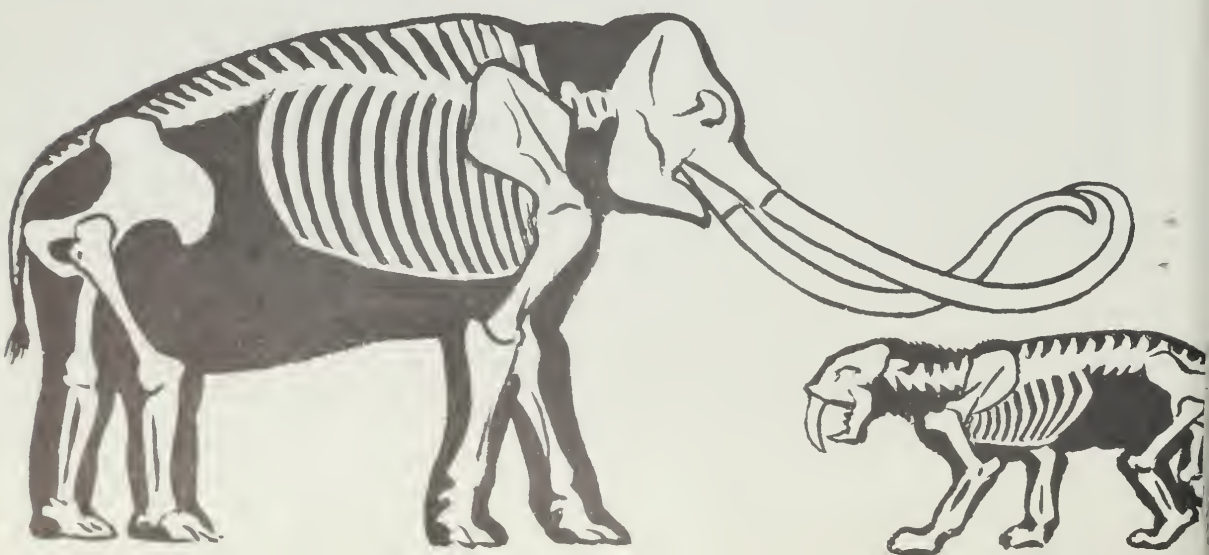
Over a period of thousands of years, mammals, birds, and even insects became trapped in the sticky tar. Unable to free themselves, they died and sank below the surface.

Giant ground sloths, mastodons, camels, and saber-toothed cats were no more successful at escaping the tar than were rabbits and mice. Long-legged storks were no better off than insects and tiny birds.

Bears, early horses, bison, and great mammoths fared no better than deer and wolves.

Bones from this tar pit have kept paleontologists—scientists who study fossils—busy for years.

Here, indeed, was a great variety of fossils to help tell the story of how plants and animals have changed and developed as the earth and its climate changed. Although some kinds of life died out, others remained much the same, hardly different from plants and animals we know today.



While some early-day mammals were struggling in the La Brea tar pits, others were roaring, thumping, and trumpeting in many parts of North America. Many were to feel the sharpness of man's weapon points.

A camel was killed by hunters of the long ago camped near Tule Springs, in what is now Nevada. Its hide was scraped clean of flesh, probably for use as clothing. The meat was roasted over a fire and eaten, the bones flung aside to land where they would.

How do we know this? It is a probable story pieced together by archeologists from their study of a few artifacts, charcoal, and bones found at the ancient campsite.

"But just what are artifacts?" you may be asking. Artifacts are things man has made and used—tools, weapons, clothing, jewelry. They tell whether man was hunter or farmer, of his arts and crafts, of how he lived. In America, artifacts help tell the story of people in our land before Europeans came, a story that goes back thousands of years.

It is roughly three and a half centuries since the Pilgrims landed at Plymouth Rock and about five hundred years since Columbus came to our shores. No one knows for sure when man first came to America. But it was nearly twenty-eight thousand years ago that hunters at Tule Springs killed the camel and feasted. It was that long ago that men camped there, leaving traces of their stay.

At least ten thousand years ago, before the ancient bison died out, a man chipped out a beautiful spearpoint. It was fluted around the edges, grooved down the middle. The point was made of stone by someone who used tools of stone and bone. This man, or perhaps it was a boy, shot the spearpoint into a bison.

The bison served as food for the man and his companions. But the spearpoint lay firmly lodged in the bison's bones down through the centuries. There it was found by archaeologists digging near Folsom, New Mexico, in 1926. That particular find was the first real proof that man had been in the land during the time of the ancient bison.

Spearpoints chipped in just that special way have been found in many parts of the country. But wherever they are found, they are called Folsom points, and the hunters of that time are called Folsom men.

Other traces tell of early man's travels across the land. Stone artifacts have been found in Alaska, in New York, and in Virginia. An ancient human skull was unearthed in Texas, the even older skeleton of a girl was recovered in Minnesota, and shredded bark sandals were found in a cave in Oregon.

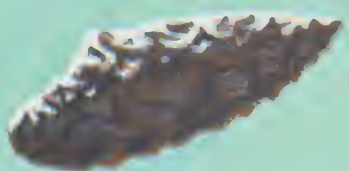
FLAKING A SPEARPOINT
WITH A BONE TOOL

ANCIENT SPEARPOINTS

Folsom
New Mexico

Clovis
New Mexico

Gypsum Cave
Nevada



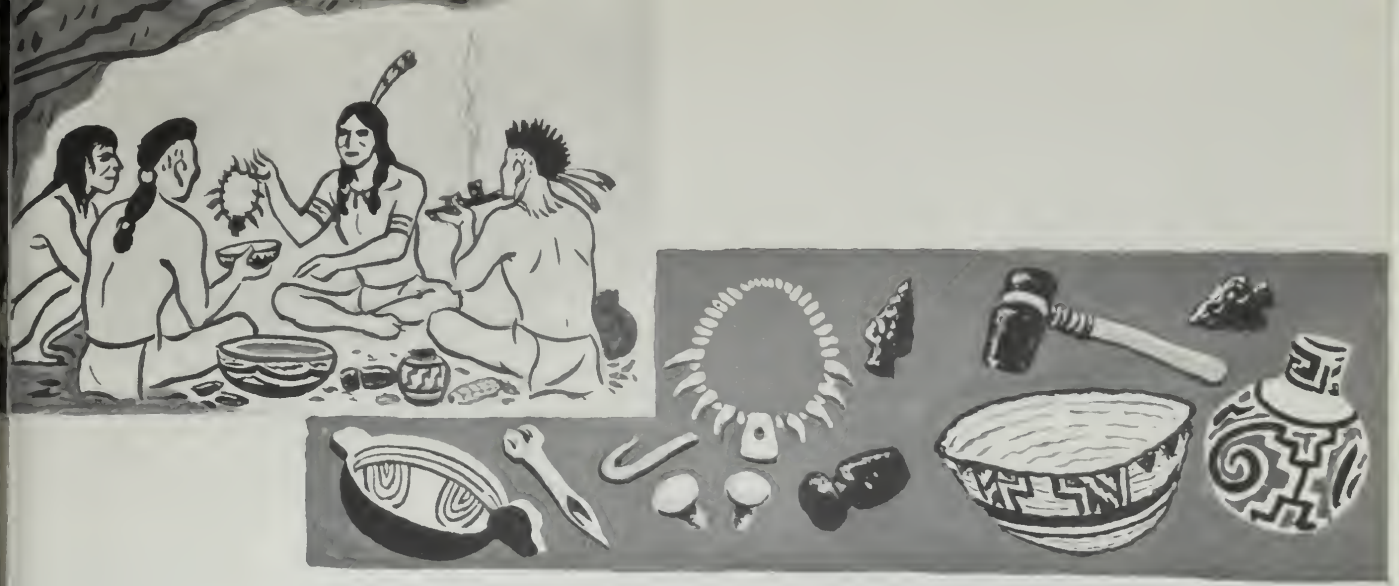
Sandia Cave, the one discovered by Boy Scouts in New Mexico, is an example of how archaeologists work to dig up the past.

Through thousands of years the cave had been used as a shelter, sometimes by men, sometimes by animals. Occupants left traces of their stay, all adding to the mounting pile of trash and bones. The cave floor rose higher and higher. To the workers digging down, it was like digging farther and farther back into time.

The first objects uncovered went back only about a thousand years—just yesterday in time to archaeologists. Pots for storing and cooking corn, beans, and squash came to light. Then came baskets that had been used for storing and cooking food.

Many layers down, Folsom spearpoints were found. Bones appeared. There were bones of bison and mammoth, ground sloth and camel, prehistoric animals such as had come from the La Brea tar pits. Digging went on, but no more artifacts or even bones turned up. Yet this was part of the story, too. It told that the cave had not been used for a long, long time.

However, deeper yet, came more animal bones—ancient horse, camel, and mastodon bones among others. With these bones were the spearpoints we now call Sandia points. These are different from Folsom points, apparently made by men of an even earlier time.



Russel Cave, in Alabama, did not go as deep in time as Sandia Cave but proved to be a wonderful record of Indian life. Layer by layer, the record went back from men who used the cave at the time of the Pilgrims' coming to a period nine thousand years ago. This is indeed a long record.

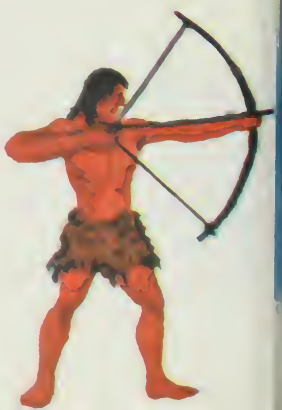
First came arrowheads and pottery. Farther down were baskets, stone axes, spearpoints, and pestles. There were necklaces made from the teeth of the great bear and hollowed leg bones from the same animal which, when stuffed with fat, made smoky torches. Rings and earplugs of stone, shell, and bone were found. Skeletons, too, were uncovered, buried by other dwellers in the cave.

Scientists believe that this cave was used as a meeting place for Indians from all over the country. There they exchanged ideas and ways of doing things. They traded jewelry, weapons, tools, baskets, pots, and food with each other, or so it appears.

Over the years, archaeologists studied their various findings from different places in North America and compared notes. Gradually the story of man in America began to take shape, told by the traces he left behind.

Most distant in time were the early hunters, the Ice Age people who probably walked into our land from Asia. They came over a land bridge that once joined the two continents when great sheets of ice that covered the land were melting. These men came after game, banding together to hunt the huge animals of those days. Hunters trapped animals in pits and then hurled rocks down or drove the animals to their deaths over cliffs.

These hunters used the dart, or spear. This was improved by means of a spear thrower called the atlatl that could send a weapon farther and faster.



Much, much later were the hunters who used bows and arrows tipped with stone or bone points. These men left thousands of arrowheads strewn across woodlands and plains.

As time went on, different groups of men settled in different parts of the country. Location, climate, and varying plant and animal foods available brought about different ways of life.

In the Southwest, great numbers of early Indians, now called Basketmakers, settled down from wandering to become farmers. They had no pottery, but they made baskets for storing and carrying food and water. Their cooking was done by dropping hot stones into a basket of stew. The Basketmakers ground corn, nuts, or grain, using stone mortars and pestles.

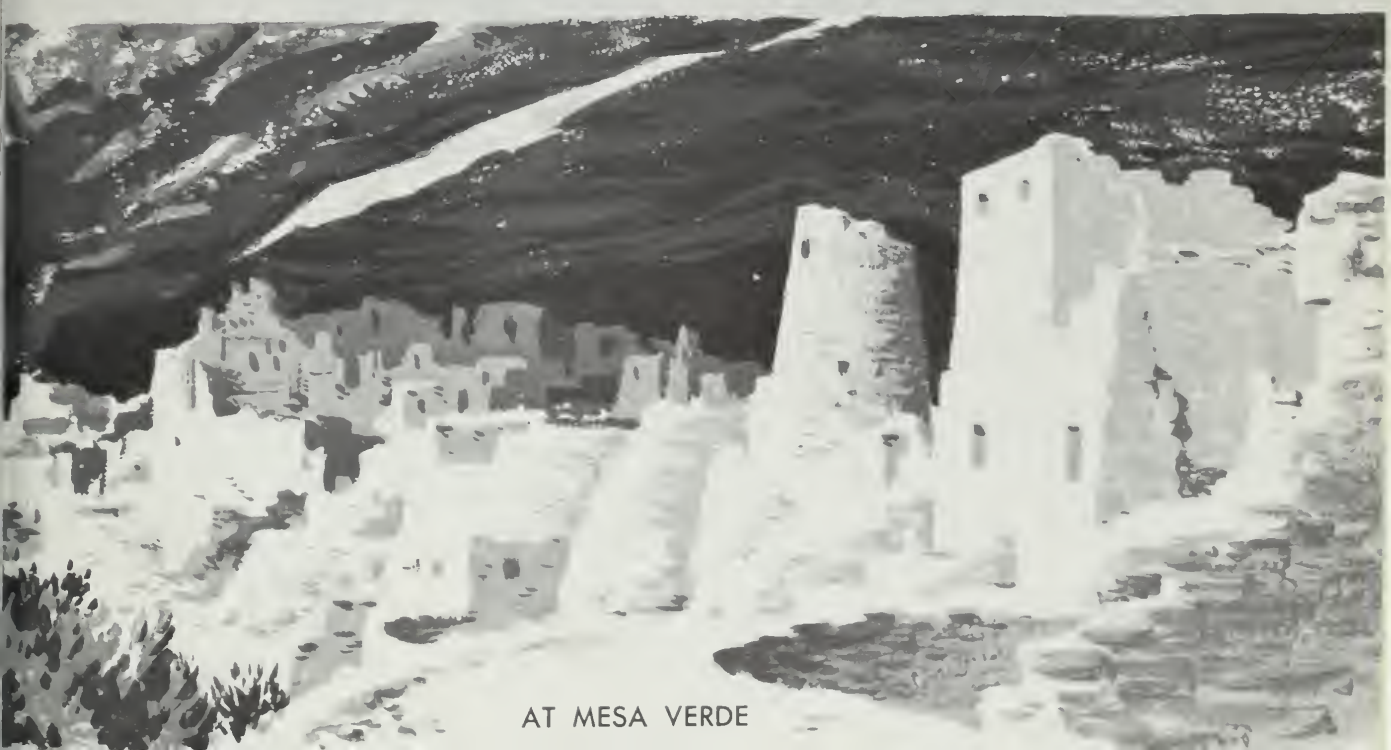
In time, after many hundreds of years had passed, the Basketmakers learned to make pottery from clay, although they kept on making baskets, too. The bow and arrow came into use, but the atlatl also continued to be used in the hunt.

For centuries these Indians lived in caves in the sandstone cliffs. Much of their time, however, was spent in the open, hunting and caring for their gardens of corn and squash.

More time passed, a long, long time. Then about nine hundred years ago the Basketmakers improved their cave shelters. Using stones and mud, they built walls inside the cave, forming separate rooms. There were private apartments for families, food storage rooms and rooms for religious ceremonies—a whole village within a shallow cave in the side of a cliff.

Villages were built on mesa tops and in wide, deep washes, too. The Indians who lived in them farmed the nearby land, as did the cliffdwellers.

These villages built in caves and on mesa tops later came to be known as pueblos, the Spanish word for village. And from this point on in their history these Indians are no longer called Basketmakers. They are known as the Pueblo people.



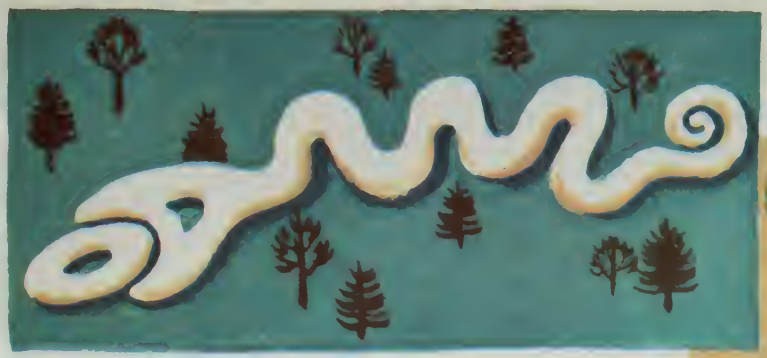
AT MESA VERDE

Man in America had come a long way from those early wanderers who lived in temporary shelters with few possessions and whose main source of food and clothing was game hunted with the spear.

Now with bow and arrow man could throw a weapon farther, faster and more accurately than ever before. He planted and harvested food. He had household utensils of pottery in addition to those of basketry and stone. And he had solid, permanent buildings.

Although their occupants have been gone for hundreds of years, old pueblos may still be seen in the Southwest. Some of the most famous are at Mesa Verde, Colorado. An outstanding one is Pueblo Bonito, in New Mexico, with over five hundred rooms.

A MESA-TOP PUEBLO



SERPENT MOUND

ANIMAL MOUND

Quite different from the Pueblo peoples were the Mound Builders of the southeastern and midwestern parts of the country. No one is quite sure just who the Mound Builders were or when they began building mounds. But these people were at work centuries before the time of Christ. Early Mound Builders are called the Adena. Later generations are called the Hopewells, and their artifacts have proved them to be fine artists and craftsmen.

The huge earthworks of the Mound Builders are of many sizes and shapes. Some are formed like animals, birds, or snakes, with no apparent use. Other mounds served as temples and as dwellings for certain chiefs. Still others were burial mounds.

From the mounds have been taken stone carvings of human figures and masks. Stone pipes carved in the shape of birds and animals and copper headdresses set with freshwater pearls have been found. Other artifacts show that these people were farmers, hunters, and workmen, as well as artists.

To add to the story of Indian life of the past, we have the pictures Indians left on rocks all across the land. Some were pictures painted on rocks and are called pictographs. Others were scratched or chiseled into the rock and are called petroglyphs.

Deer, mountain sheep, birds—objects of the hunt—were favorite subjects for such pictures. Other symbols stood for rain and sun. The pictures may have been made as magic symbols in the hope of attracting game, or they may only have been doodles.

Early hunters, Basketmakers, Pueblo peoples, and Mound Builders were all people of the past, part of the story of man in America. There are yet many pieces of the story to be filled in because there must have been others, too, who walked our land leaving traces at campsites and burial grounds. And every so often a little more is learned about Indians of long ago when campsites long hidden are revealed, sometimes by bulldozers ripping up the land—as we shall soon see.

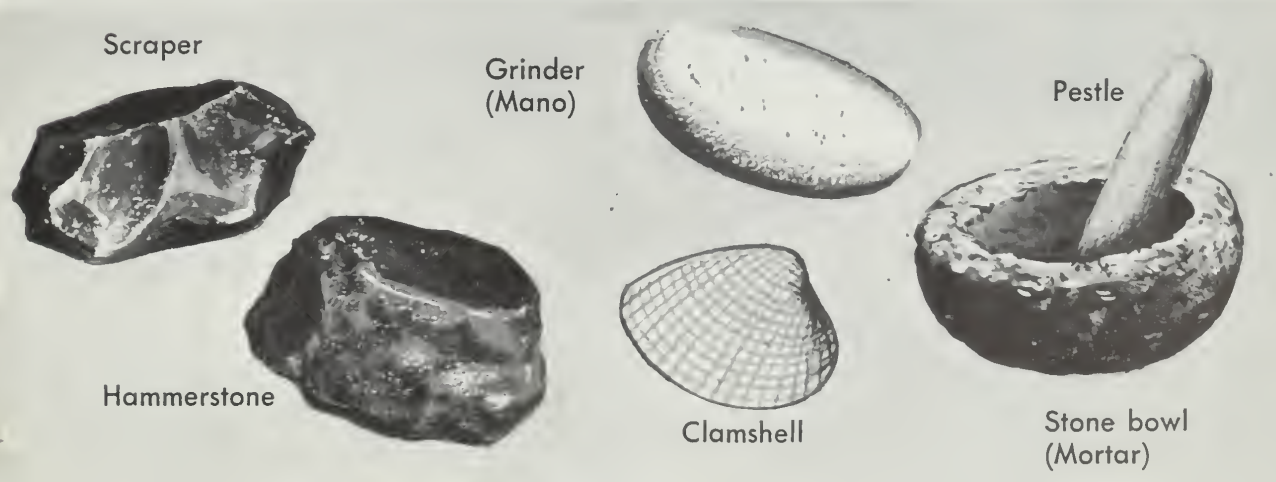
Newspaper Rock
Arizona

How would *you* like to take part in a real "dig" and uncover the remains of an Indian camp seven thousand years old? Some California boys and girls were asked this very question.

On a high bluff near La Jolla, excavation had started on a building site. Bulldozers turned up clamshells, stone scrapers, hammerstones, and other artifacts. They had exposed an Indian midden, or trash dump. Work was stopped to allow time for archaeologists to recover whatever they could find.

A trained archaeologist invited fourth-, fifth-, and sixth-graders from a nearby school to dig at the site under his supervision. Over fifty excited children showed up.

"Seven thousand years ago, perhaps more," the children were told, "Indians had a campsite here. From stones they chipped scrapers and choppers. They used other stones as hammers or grinders for nuts and seeds. They brought clams up the cliffs from the beach. These people wore beads of shells and ornaments of bone—and probably not much else. We think this because of finds at nearby sites."



There might be Indian burials, too, the children were told. The archaeologist continued, "If you find a skeleton, remember it was once a living person. He may have lived differently than we do but he worked to get food and protect his family. Let us treat Indian burials with the same respect you would burials of today."

You can imagine how eager the children were to begin. But their instructor explained, "An archaeologist works in certain ways. There are rules to be observed. First we'll walk over the area searching carefully for artifacts lying exposed on the surface of the ground. Let's go!"

The site was divided into five-foot squares with stakes and string. Boys and girls worked in pairs, digging carefully with trowels. Loose dirt was shoveled into a screen to recover small artifacts that might otherwise be overlooked.

Large objects were gently dug around, then dusted off with a brush. Every object was carefully noted and numbered, and a description of its location and surroundings was kept.

The sea, too, gave up treasures of the past. Older boys donned skin diving outfits and became submarine archaeologists. In waters below the bluff they explored campsites that had once been dry land. Grinding bowls by the hundreds, mortars, choppers, and other stone artifacts were recovered.

Week after week, after school hours and on Saturdays, and on into the summer, the work went on. The diggers moved from one site to another, racing to keep ahead of the work going on for the building project.

Thus a new group of young archaeologists was created, a group of boys and girls who learned the difference between true archaeological digging and mere souvenir hunting.

After fossils and artifacts have been picked up or uncovered, what then? What happens to them?

Most of the finds go to museums because people from museums do much of the digging. But the digging is only part of the work. When bones or artifacts are brought to the museum, they must be carefully cleaned. They must be sorted and studied. Often fossil bones are sent to the museum still embedded in stone. The stone must be chipped away very carefully.

Microscopes, X-ray machines, delicate tools, and tiny brushes are part of the equipment for most museums of natural history. Experts in different sciences contribute their knowledge in classifying and dating fossils and artifacts.

Today it is possible to find with greater accuracy than ever before just how old an object is. Atomic scientists have developed "clocks for the ages" which measure time not in minutes but in thousands of years. They measure time backward, into the distant past.

One of these "clocks," the carbon-14 test, dates material from as far back as fifty thousand years. It works only on organic material—once-living things—plants, animals, humans.

An even more amazing "clock" is the newer potassium-argon process. It is not limited to organic material but can be used for dating rocks and other inorganic material as well. This "clock" runs much farther back in time than does the carbon-14 test. With this process, it is possible to date material from millions, even billions, of years ago.

BEHIND THE SCENES AT A MUSEUM

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Suppose *you* find an ancient bone, a rare fossil, or an artifact. To find out about it, you should take it or send it to a scientist or a museum of natural history. You would tell where you found the bone, how deep it was in the earth, what other things were near it—everything you had noted when you found the bone.

Time will be needed to examine your find because scientists are busy with many projects. It may be weeks or months before you receive information about what you sent. The object will be yours although you may want to leave it at the museum if it proves to be something the scientist would like to exhibit.

Scientists, artists, and craftsmen work together to make museum displays as informative and as interesting as possible.

Bones are assembled into complete skeletons, mounted and put on exhibit. Artists draw pictures of ancient people and animals as they probably looked in life. Sculptors make lifelike figures from a variety of materials.

Artists paint backgrounds showing the kind of places in which people and animals lived. They put either real or artificial stones, bushes, water, grass—whatever is suitable—around the figures in the display.

This kind of display of a creature and its surroundings is called a diorama. Some museum dioramas are life-size, some in miniature. They may show Indian ways of life, where they lived, what they wore, the pots, baskets, and food they used. Whatever the diorama shows is based on artifacts and fossils that have been found.

Displays of fossils and artifacts show us that objects from the past are much more than just souvenirs. Because scientists have studied them and shared their findings with us, we can better understand the living things of earth, both past and present. With imagination we can see for ourselves the story that was written without words—the pageant of the past—brought before us by means of stones, bones, and arrowheads.

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